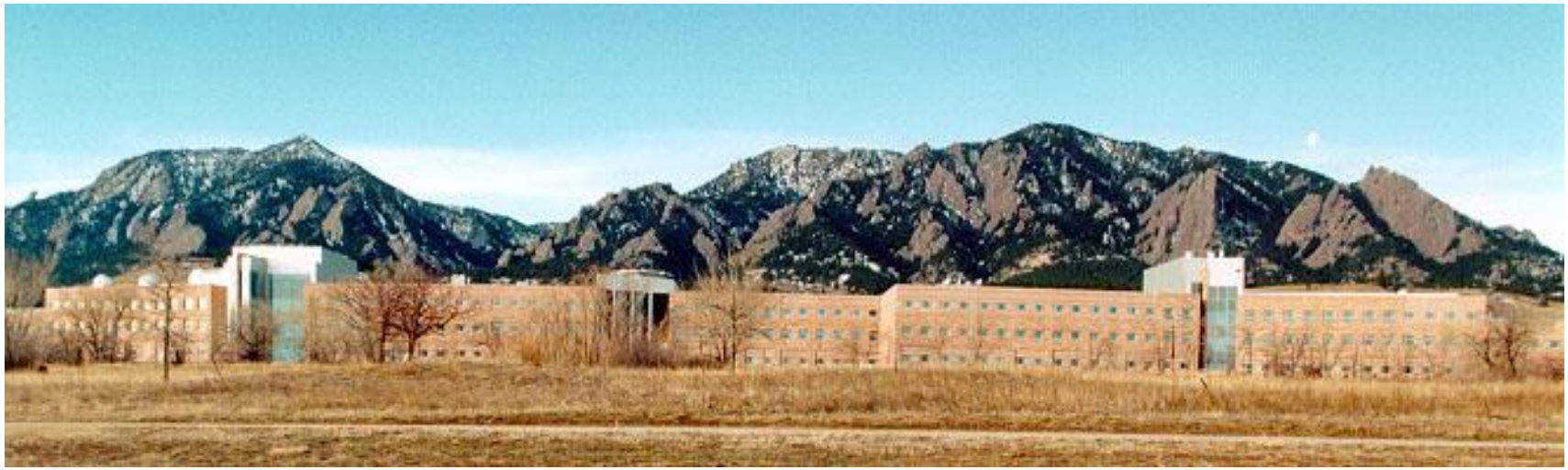

Quarterly Divisional Review

07 Apr 2008

2QFY08

Dr. William F. Denig, Chief

Solar & Terrestrial Physics Division

NOAA/NESDIS/NGDC

303 497-6323

William.Denig@noaa.gov

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Solar & Terrestrial Physics Division

- **STP Program Overview**
- **Milestones & Performance Measures**
- **Upcoming Events**
- **Accomplishments**
- **Special Interest Items**
- **SPIDR Metadata Enhancements**
- **Issues & Summary**

Personnel
STP Program Overview

Solar & Terrestrial Physics Division
William Denig/F, Chief
Janet Brown/F, Secretary
Karen Horan/F, Physical Science Tech
Craig Clark/F, Scientific Data Tech

Space Environment Group (SEG)

Eric Kihn/F, Team Lead
- Terry Bullett, AFRL
- Ray Conkright/C
- Ed Erwin/F
- Justin Mabie/C
- Rob Redmon/F
- Herb Sauer/C
- Dan Wilkinson/F
- Jim Manley/C
- Erin Rowland/S
- Dave Fischman/F

Earth Observation Group (EOG)

Chris Elvidge/F, Team Lead
- Kim Baugh/C
- Ben Tuttle/C
- Tilottama Ghosh/C

Earth Geophysics Group (EGG)

Vacant/F, Team Lead
- Patrick Alken/C
- Rob Prentice/C
- Andrew Kimbrel/S
- Don Herzog/C
- Fran Coloma/C
- Dave Fischman/F
- Andrea Bilich, NGS

Key
F – Federal
C – CIRES/CIRA
S – Student

Personnel Changes
STP Program Overview

- **Gains**
  - *none*
- **Losses**
  - Ara Howard (EOG)
- **Vacancies**
  - SEG Space Physicist – Currently on hold; CIRES PRA
  - STP Real-time Data Manager – Currently on hold; CIRES PRA
- **Inbound**
  - EOG Scientific Programmer – Selection made
  - Sara Mohon (SEG) – Hollings Scholar – College of William & Mary
  - Ethan Peck (SEG) – Hollings Scholar – Cornell University
- **Pending**
  - Terry Bullett (SEG) – Transition from AFRL to CIRES PRA (Apr 14th)
  - NGS CORS Technician – Pending – NGS action (FY08 or later)

MOUs / MOAs Status
STP Program Overview

STATUS

Scope	Team	Type	Partner	NOAA Legal	DOC Legal	NGDC Signed	Partner Signed	Start	End	Status	
DMSP Archive	SEG	MOA	DMSP	X	X	X	X	30-Mar-07	30-Sep-09	G	In place - nothing to report
SWx Climatology	SEG	MOU	AFCCC	X	X	X	X	27-May-04	01-Oct-14	G	In place - nothing to report
Ionospheric Data	SEG	MOU	AFWA	X	X	X	X	21-Aug-06	21-Aug-11	G	In place - nothing to report
Ionosonde Sites	SEG	MOU	USGS					*TBD*	*TBD*	Y	*Stalled at legal*
Ionosonde Deploy	SEG	MOU	USAFA					*TBD*	*TBD*	Y	*Pending AFWA funding*
NASIC	EOG	MOU	NASIC	X	X	X	X	09-Mar-06	01-Jan-11	G	In place - nothing to report
CORS Support	EGG	AGR	NGS	n/a	n/a	X	X	01-Oct-03	30-Sep-08	G	In place - nothing to report

CDMP FY08 Status
STP Program Overview

Dataset	Funded in FY08	POC	Contractor ($K)	NGDC ($K)	% Expended
Heat capacity mapping mission (L44)	X	Elvidge	60.0	6.0	0.0%
DMSP film scanning (L3)	X	Elvidge	825.0	82.5	42.6%
DMSP P/L activiation messages (L41)	X	Elvidge	30.0	3.0	0.0%
Historical solar spectral data (L16)	X	Denig	65.0	6.5	8.1%
Cosmic rays - Forbush archives (L42)	X	Denig	85.0	8.5	0.0%
Historical solar observations (L18)	X	Denig	90.0	9.0	10.6%
Historical ionosonde records (L7)	X	Redmon	75.0	7.5	0.0%
				123.0	

The CDMP DMSP Nighttime Lights project is a featured video in the contractor's 2007 annual report

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FY08 Milestones
Milestone & Performance Measures

	PPBES Program	STP FY08 Milestones	Status	Planned Completion Date	Actual Completion Date	Responsible Person
AOP →	Space Weather	Integrate Mirrion real-time ionospheric data access system with the Space Physics Interactive Data Resource (SPIDR) - *Deferred FY07 Milestone*	C	(Q1) 12/31/2007	(Q1) 12/1/2007	Redmon
	Marine Transportation Systems	Improve crustal magnetic field model from degree 100 to degree 120 by minimizing the impact of spurious magnetic anomalies in satellite magnetic datasets.	C	(Q1) 12/30/2007	(Q1) 12/20/2007	Maus
	Marine Transportation Systems	Produce radiance-calibrated, cloud-free, nighttime-lights composites for 2005-2006 using Defense Meteorological Satellite Program (DMSP) earth-imagery data.	C	(Q1) 12/31/2007	(Q1) 12/20/2007	Elvidge
	Space Weather	Achieve Initial Operating Capability for the Space Environmental Integration System (SEIS) at the USAF Combat Climatology Center for use in battlespace M&S scenarios.	C	(Q2) 3/31/2008	(Q2) 3/31/2008	Kihn
	Space Weather	Develop Application Programming Interface (API) extensions for ordering datasets via the Comprehensive Large-data Array Steward System (CLASS).	G	(Q3) 6/30/2008		Kihn
	Marine Transportation Systems	Implement an improved cloud-detection algorithm in real-time/static nighttime lights imagery products using 0.5-degree spatial resolution surface temperature grids.	G	(Q4) 9/30/2008		Elvidge
	Marine Transportation Systems	Create station-level metadata records for 80% of all operating magnetic observatories providing data to NGDC in compliance with FGDC and emerging ISO standards.	G	(Q4) 9/30/2008		Herzog / Fischman
AOP →	Space Weather	Complete 15-year environmental climatology for the coupled Ionosphere-Thermosphere-Magnetosphere (ITM) system using the Space Weather Analysis (SWA) framework.	G	(Q4) 9/30/2008		Mabie
AOP →	Space Weather	Release internet-enabled tools to allow station operators to enter magnetic observatory station-level metadata through the Space Physics Interactive Data Resource (SPIDR).	G	(Q4) 9/30/2008		Kihn
AOP →	Space Werather	Incorporate MetOp Space Environmental Monitor (SEM) data into NGDC space weather archives and provide scientific datasterwaship of the SEM data.	G	(Q4) 9/30/2008		Wilkinson
AOP →	Marine Transportation Systems	Release version 2 of the degree-720 NGDC geomagnetic field model using a main magnetic field model plus contributions from the lithosphere and magnetosphere.	G	(Q4) 9/30/2008	*Split with MGG*	Maus

AOP → AOP milestone

C **Complete**

G **On-track**

Y **Watch Item**

R **Issue**

Internal 2QFY08 Milestone
Space Environmental Integration System

Milestone – Achieve Initial Operating Capability for the Space Environmental Integration System (SEIS) at the USAF Combat Climatology Center for use in battlespace M&S scenarios.

Background – Despite a mandate to include a realistic environment from all physical domains, the space environment continues to be underrepresented in military M&S. A number of factors contribute to this problem including availability of data, the non-intuitive nature of space, lack of standard impact rules, and difficulty in interpreting physical parameters.

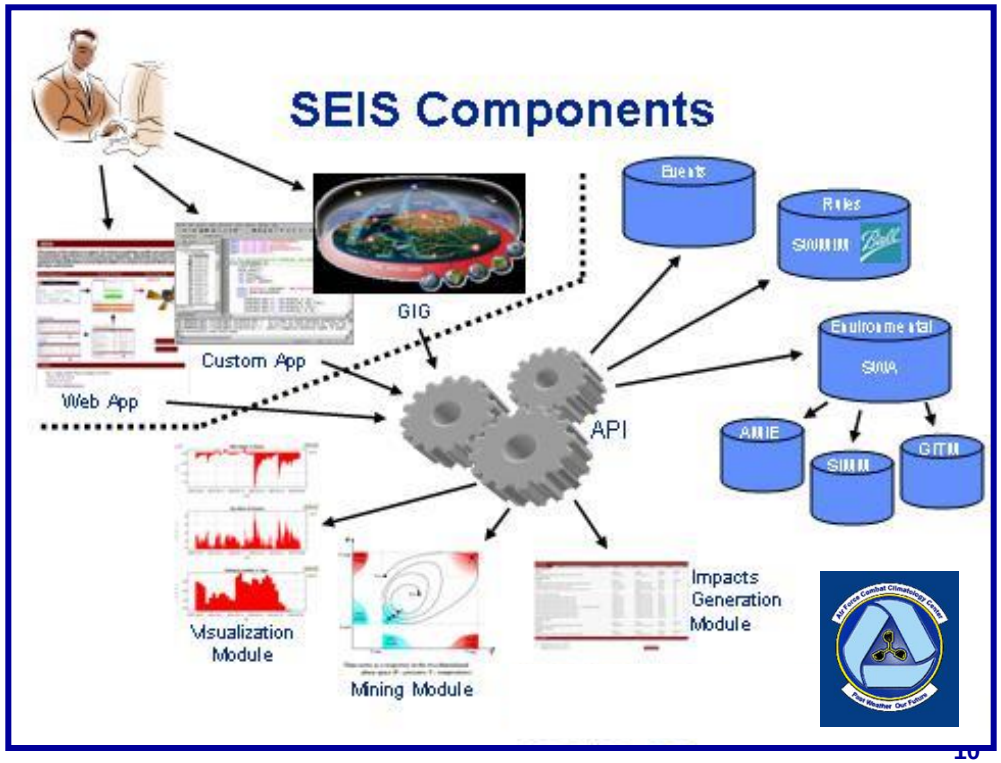
Significance – Military planners must be trained to account for space environmental effects in order to make effective decisions.

Completion Date:

Planned: (2QFY08) 3/31/2008

Actual: (2QFY08) 3/31/2008

Dr Eric Kihn will present the paper, *Space Environmental Integration System (SEIS) – The Warfighters' Bridge to Space Weather Effects* at the **Spring Simulation Interoperability Workshop** in Providence RI, April 14-18.



Simulation Interoperability Standards Organization
www.sisostds.org

FY08 Performance Measures
AOP Inputs (15 Nov 07)

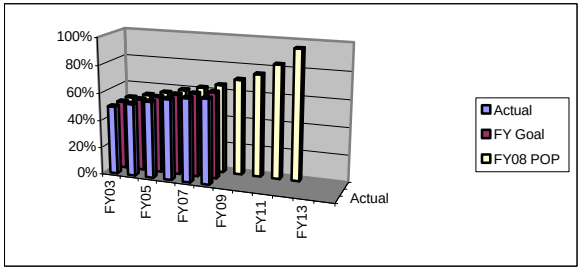
Matrix Program:	Space Weather						
Program Manager:	**Tom Bogdan**						
Program Capability	**Program Capability Funding (source and $ amount by LO)**	**Performance Measure (PM); identify whether Corporate PM (GPRA, PART, PMA, IT Mgmt) or Internal (not reported outside of the Line Office or Goal)**	**FY07 Baseline**	**FY08 Target**	**Milestone (assigned to a single LO component for execution)**	**Quarter Due**	**POC Responsible**
WW-SWX-AAD Archive and Access Space Weather Data	$1,639K/NESDIS	Corporate PM: Improved Retrospective Products for Understanding the Space Environment (cumulative)	2	5	Integrate Mirrion real-time ionospheric data access system with the Space Physics Interactive Data Resource (SPIDR).	Q1	NGDC - Robert Redmon
					Complete 15-year environmental climatology for the coupled Ionosphere-Thermosphere-Magnetosphere (ITM) system using the Space Weather Analysis (SWA) framework.	Q4	NGDC - Justin Mabie
					Release internet-enabled tools to allow station operators to enter magnetic observatory station-	Q4	NGDC - Eric Kihn
		Corporate PM: % of Archived SWX Data Available to the Public On-Line	61%	63%	Incorporate MetOp Space Environment Monitor (SEM) data into NGDC space weather archives and provide scientific data stewardship of the SEM data for the scientific community.	Q4	NGDC - Dan Wilkinson

FY08 Performance Measures
Milestones & Performance Measures

Performance Measures

1 - Percentage of archived SWx data available to the public on-line

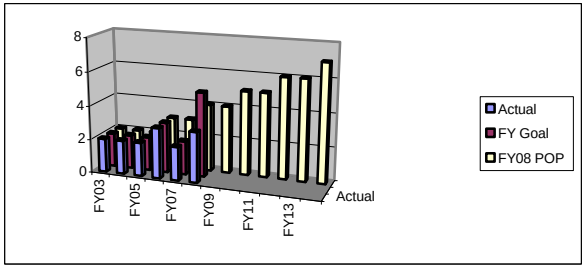
	Actual	FY Goal	FY08 POP
FY03	50%	50%	**50%**
FY04	53%	53%	53%
FY05	56%	56%	56%
FY06	59%	59%	59%
FY07	61%	61%	62%
FY08	62%	63%	**65%**
FY09			70%
FY10			75%
FY11			83%
FY12			**95%**
FY13			
FY14			



Current Month: Mar 08		
This Q Planned	Actual This Q/Total	FY08 Target
62	62%/63%	63%

2 - Improved retrospective products for understanding the space environment

	Actual	FY Goal	FY08 POP
FY03	2	2	**2**
FY04	2	2	2
FY05	2	2	2
FY06	3	3	3
FY07	2	2	3
FY08	3	5	**4**
FY09			4
FY10			5
FY11			5
FY12			**6**
FY13			6
FY14			7



Current Month: Mar 08		
This Q Planned	Actual This Q/Total	FY08 Target
3	3/5	5

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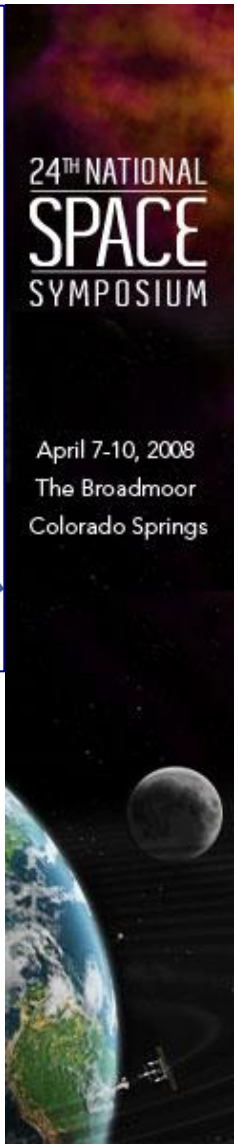
National Space Symposium



This year the **National Space Symposium** (NSS) includes over 7,500 registered participants and media representatives from across the U.S. and many foreign countries. This meeting attracts many senior government officials and industry leaders. Congressman Mark Udall is a featured speaker at the NSS. A notable panel, *Climate Change, Space, and National Security* will include the participation of Mr Scott Rayder. As in years past, **Ed Erwin** will help man the NOAA booth.

Upcoming Events
Space Weather Workshop

This year's **Space Weather Workshop** (formerly Space Weather Week) will be held April 29 - May 2, 2008 at the Millennium Hotel, Boulder, CO. The Space Weather Workshop is an annual conference that brings industry, academia, and government agencies together in a lively dialog about space weather. What began in 1996 as a conference for the space weather user community, Space Weather Workshop has evolved into the Nation's leading conference on all issues relating to space weather. **Dr Eric Kihn** will provide a talk on *Radiation Belt Tools and Climatology*.

Upcoming Events
Space Weather Enterprise Forum

Space Weather Enterprise Forum is planned for 21 May 2008 at the National Press Club. This year's forum will focus on the costs of space weather impacts & the benefits of improved space weather services with an emphasis on the anticipated needs of the user community.

The 2nd Space Weather Enterprise Forum (SWEF) will be held in Washington, D.C., at the National Press Club, on May 21, 2008.

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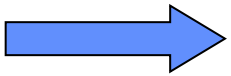

Accomplishments

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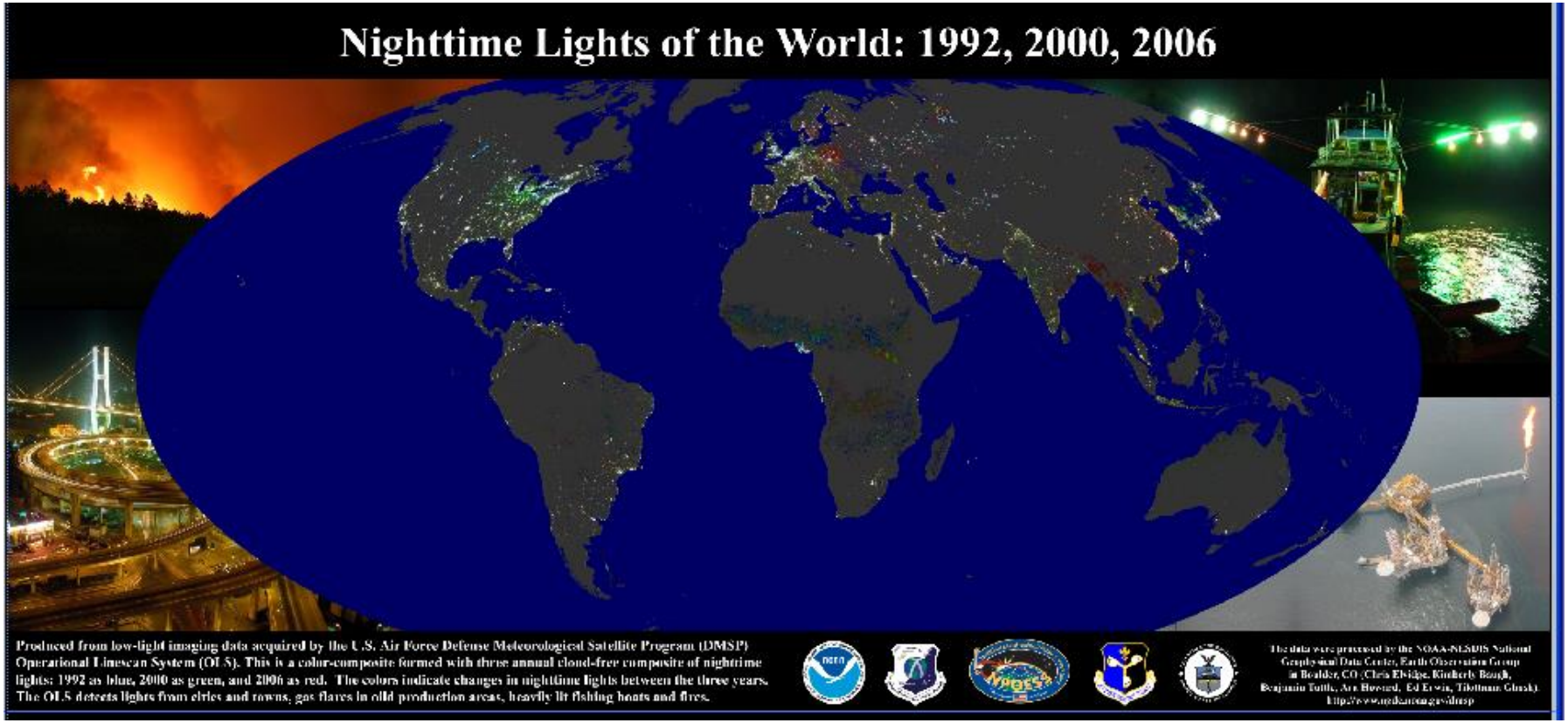
Accomplishments
New DMSP Nighttime Lights Poster



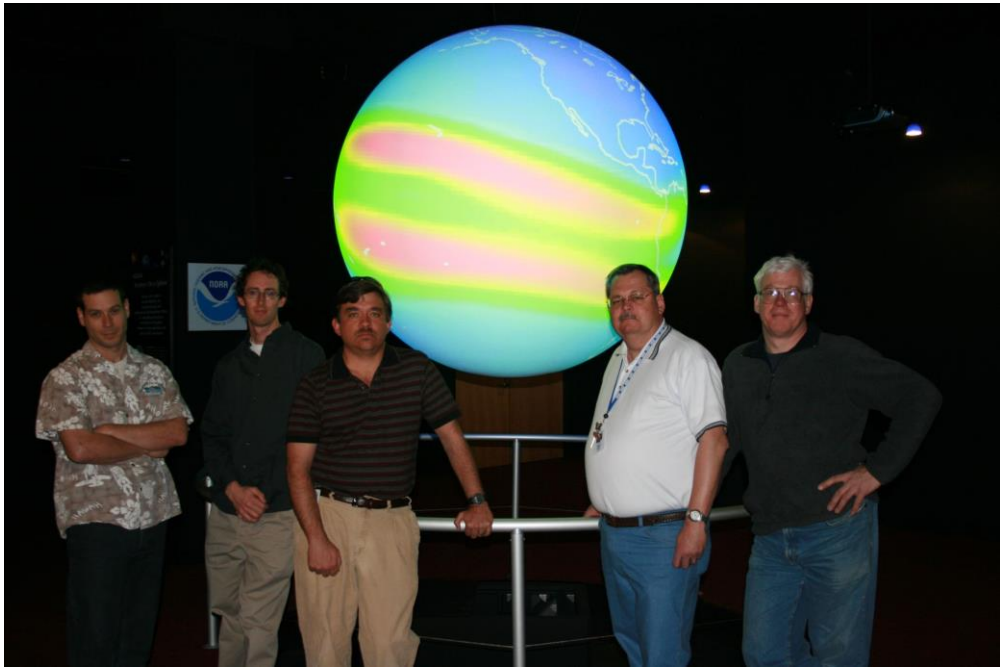
Caption: Produced from low-light imaging data acquired by the USAF DMSP Operational Linescan System (OLS). This is a color-composite formed with three annual cloud-free composites of nighttime lights: 1992 as blue, 2000 as green, and 2006 as red. The colors indicate changes in nighttime lights between the three years. The OLS detects lights from cities and towns, gas flares in oil production areas, heavily lit fishing boats and fires.

Accomplishments
Science on a Sphere – Ionosphere

Scientists from Utah State University have developed the Global Assimilation of Ionospheric Measurements (GAIM) model for the USAF AFWA. **Dave Fishman** recently incorporated a GAIM demo on the NOAA **Science On a Sphere** (SOS).

NGDC provides real-time space environmental data to AFWA as a primary input for GAIM. Model outputs are made available to the NWS/SWPC for use in NOAA space weather alerts, warnings and forecasts.

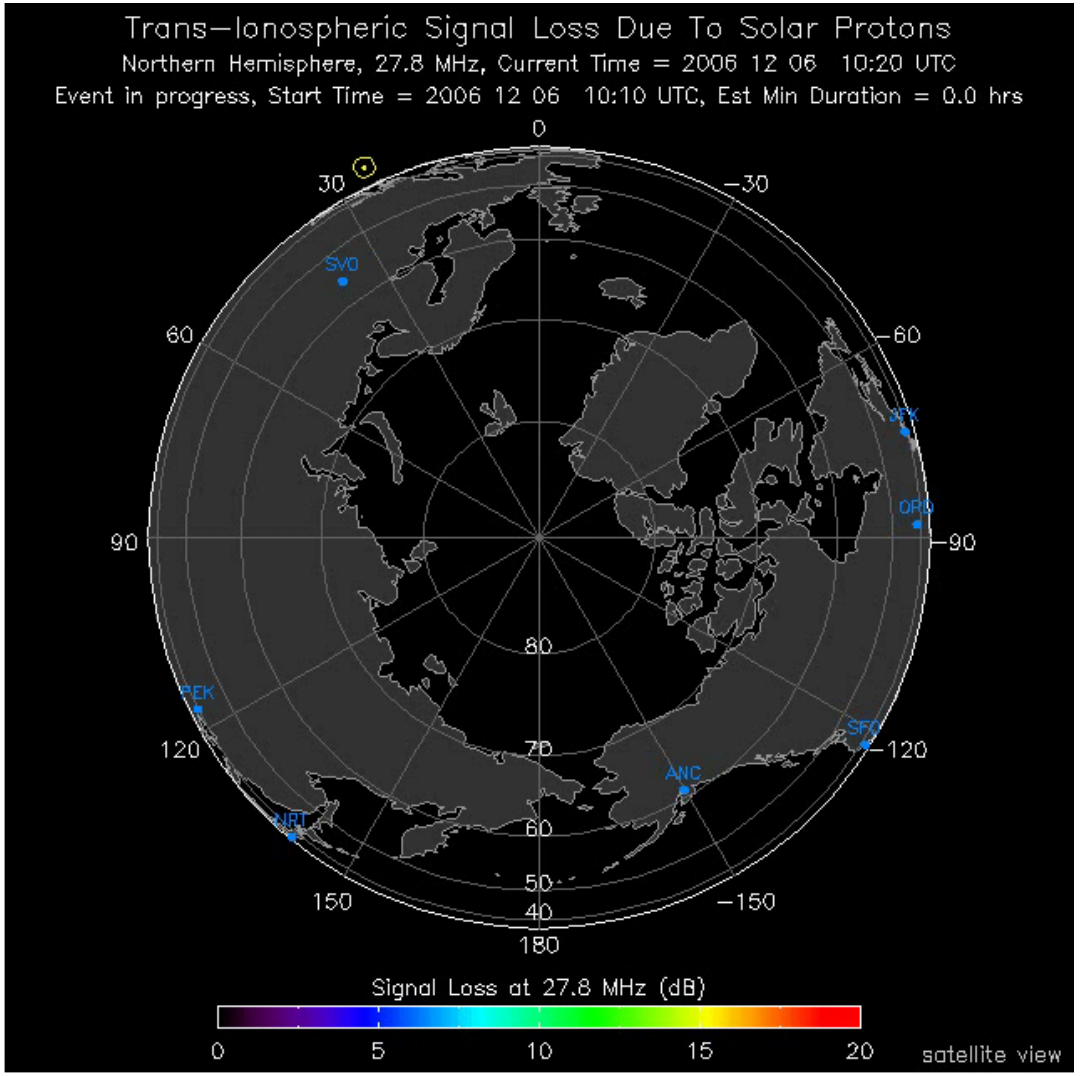
Inclusion of GAIM on SOS is an excellent education and public outreach tool.



NGDC Solar & Terrestrial Physics personnel review Science-On-a-Sphere visualizations of the GAIM ionospheric model

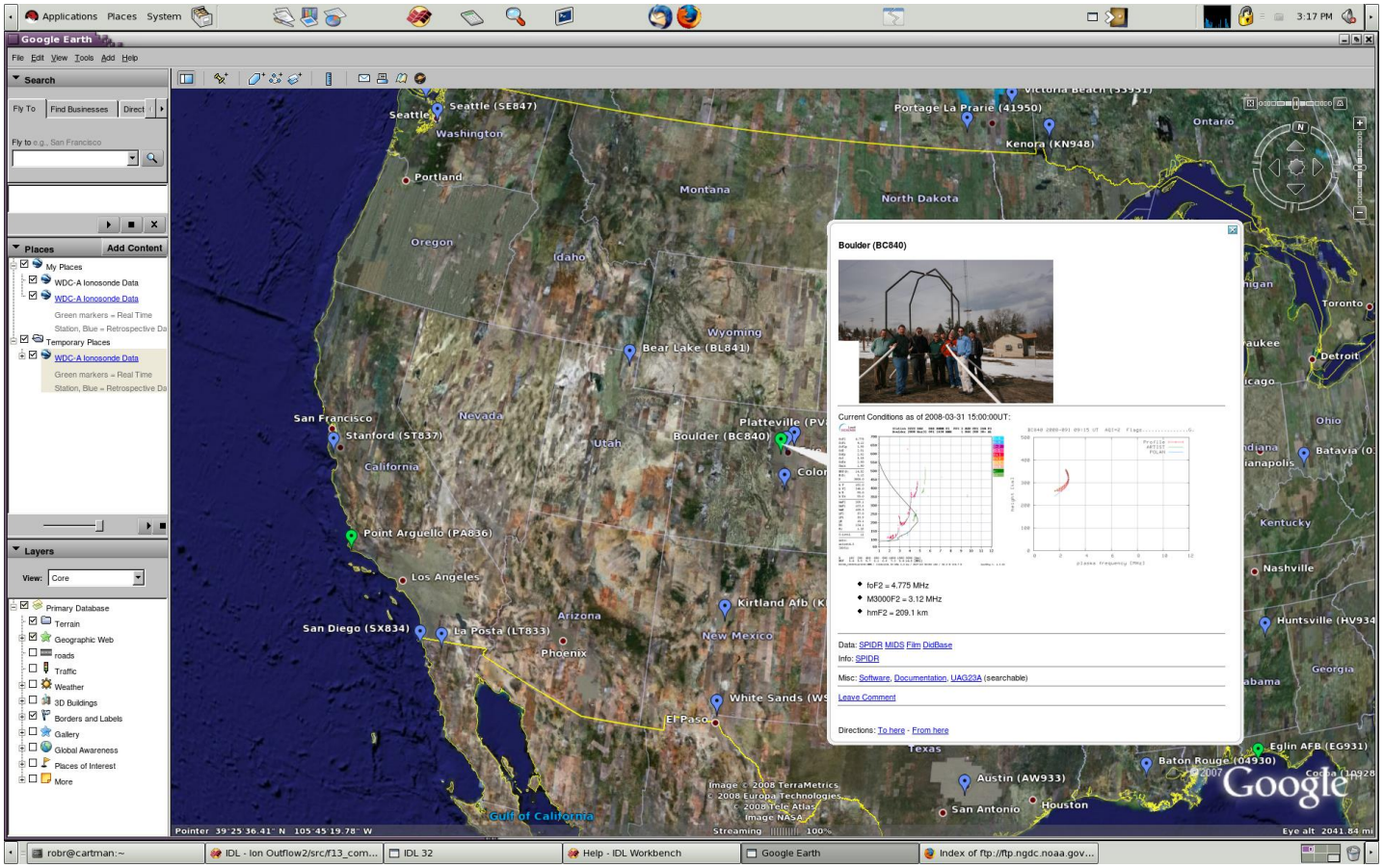
Accomplishments
High-Latitude Radiowave Absorption

NGDC guest researcher **Herb Sauer** and **Dan Wilkinson** have developed a model of high-latitude radiowave absorption based on measured energetic protons from the GOES spacecraft. The global model takes into consideration the effects of solar illumination, geometric cutoff variations, and frequency dependence. The movie on the right depicts the signal loss at 27.8 MHz for the winter northern hemisphere using GOES particle data from 06 Dec 2006. *This model is planned for operational implementation within SWPC in the current FY.*

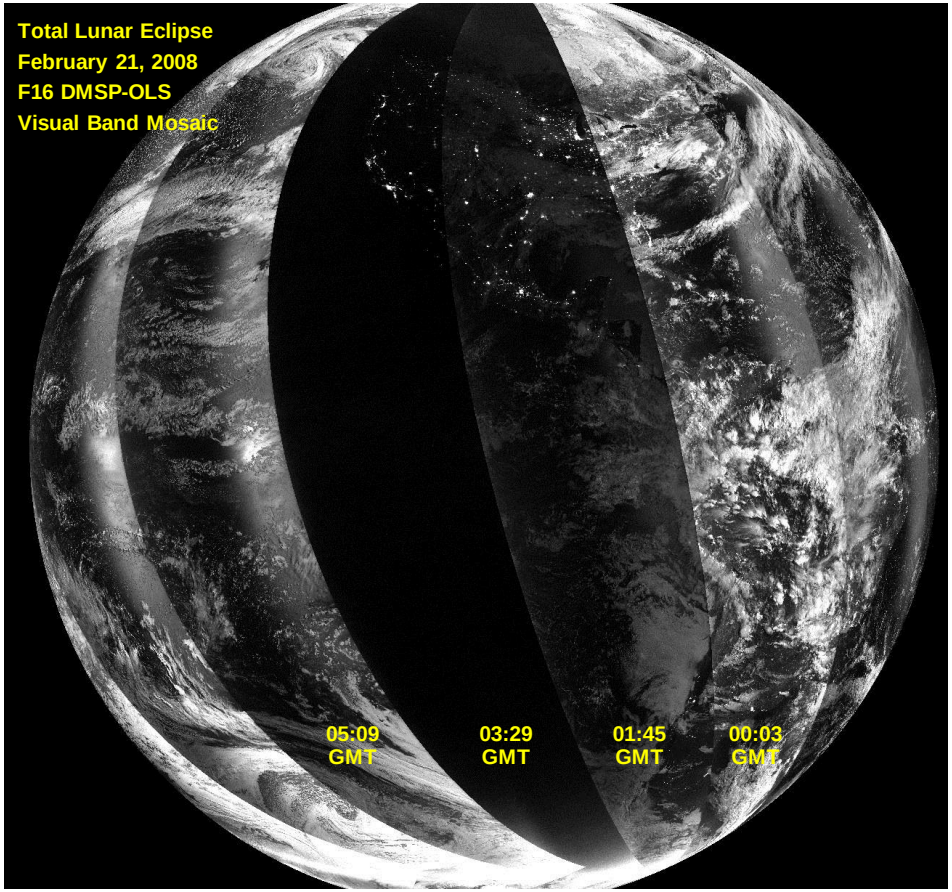


Accomplishments
Google Earth Ionosonde Layer

Rob Redmon has developed a Keyhole Markup Language (KML) utility for use in **Google Earth** applications which uses station-level metadata descriptions to identify ionosonde locations / information and to locate relevant datasets at NGDC and other data repositories (Eric Kihn's live demo to follow).



Accomplishments
Lunar Eclipse Observed by DMSP



Nighttime DMSP OLS imagery for 21 Feb 08 captured the impact of the lunar eclipse on visible-light observations of nighttime clouds. The DMSP OLS visible band is intensified at night to detect moonlit clouds. CIRES affiliate **Kim Baugh** noted that in imagery data obtained prior to the 0326 GMT lunar eclipse, clouds and the earth's surface could be clearly seen due to reflected moonlight. Similarly, on satellite passes just before and after totality, clouds and the surface were still evident but less apparent in the data. Near totality no clouds were visible at all and the ground is only indicated by the presence of man-made nighttime lights.

Accomplishments
New Geomagnetic Data from India

Manoj Nair was instrumental in securing a new source of magnetic observatory data from the **National Geophysical Research Institute** (NGRI) of India. Hourly data values from the stations at Hydrabad (HYB: 1983-2004) and Ettaiyapuram (ETT: 1980-2002) have been received and are being incorporated into SPIDR. The geomag team is working closely with the provider to ensure that only validated datasets are included in the NGDC archives.

Hyderabad Geomagnetic Observatory

Authorization

Coast and Geodetic Survey Act, Public Law 80-373, 33 U.S.C. 883a et seq., 1947. Defines the functions and duties of the Coast and Geodetic Survey (predecessor to NOAA). This act authorizes the Department of Commerce to be "the central depository of the U.S.G. for geomagnetic data" from domestic and foreign sources.

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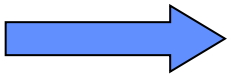

Special Interest Items

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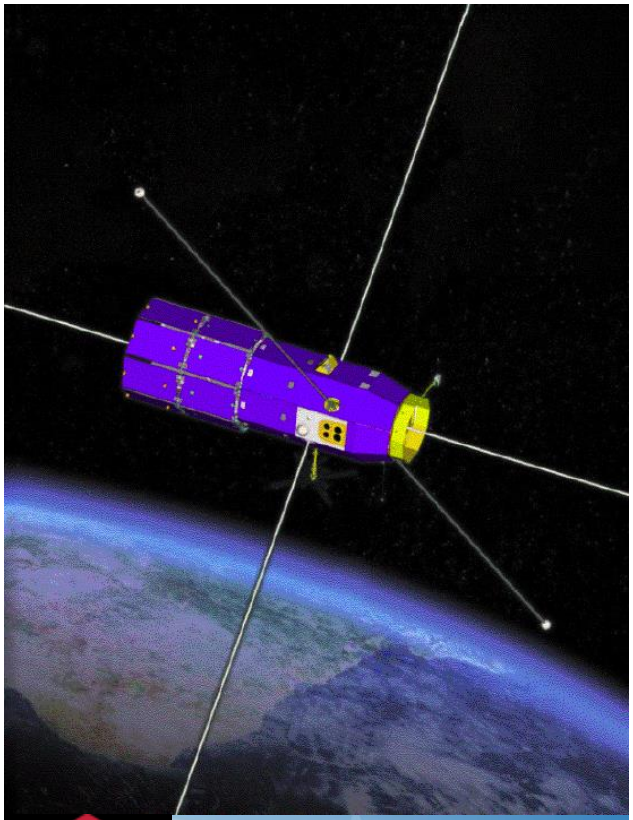
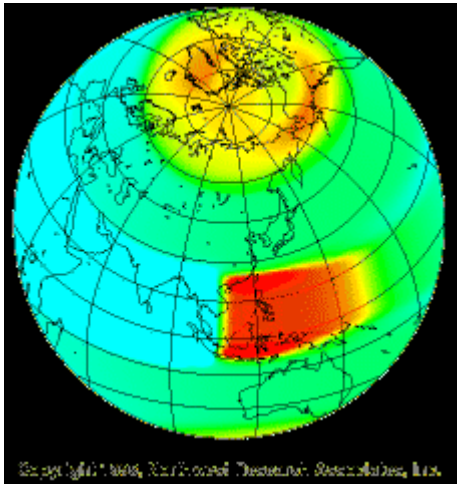
Special Interest Item

Chris Elvidge – CDMP Annual Report 2007

Special Interest Item
C/NOFS Satellite Launch



The **Communication / Navigation Outage Forecast System** (C/NOFS) satellite is scheduled for a Pegasus launch on April 10th from the Territory of Gaum. C/NOFS is a prototype operational system (satellite plus supporting ground sensors) designed to monitor and forecast ionospheric scintillation in real-time and on a global scale. The Air Force Research Laboratory (AFRL) is largely responsible for C/NOFS with additional space and ground sensors provided by NASA and NRL. NGDC will be involved in the scientific data analysis and interpretation. There have been some early discussions regarding the possible involvement of NGDC in the long-term archive of the C/NOFS datasets.



Orbital
Innovation You Can Count On™

Special Interest Item
NightSat

NGDC is involved in the planning and advocacy for the NightSat mission which is currently under consideration by NASA for a venture class ($100-200M) mission. **Chris Elvidge** recently participated in the NASA Ames workshop (25-26 Mar) on NightSat where various alternatives were discussed.

Related topic: NOAA has broached the subject of a "nighttime lights" sensor on MetOp to maintain the current DMSP capability in the evening orbit. European advocates for a LLL camera on MetOp include Dr. Martin Herold (Germany), Dr Jeff Tschirley (Italy), Dr. Pierantonio Cinzano (Italy), Dr Einar Bjorgo (Switzerland), Antonio de la Cruz (Spain), and Olivier Arino (Italy).

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Featured Demo
SPIDR Metadata Enhancements

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Issue
Refocus of NWS/SWPC Objectives

Applicable public law and regulations:

- NOAA is responsible for maximizing "the quality, objectivity, utility and integrity of information" disseminated {Public Law 106-554 (2001)}
- Program managers are responsible for stewardship of environmental & geospatial data and information throughout the process of acquiring, archiving, integrating & disseminating such data and information {NAO 212-15 (2003)}
- SWx Program mission requirements include providing "scientific stewardship of and public access to space weather data and products" {SWx Program Charter (2007)}

Issue:

- For historical reasons the GOES N-O-P SWx datasets have been processed within SWPC. Forwarding these data to NGDC has been deferred pending quality assessment. Indications are that SWPC no longer feels that the post-analysis of these data are their responsibility. Progress toward archiving these data has been suspended.

Options:

a. Consider these datasets as "lost assets" and squander a major national resource
b. Transfer these "as is" datasets to NGDC & provide A&A with minimal/no stewardship
c. Push-back on SWPC to provide definitive data products to NGDC for A&A
d. Require that NESDIS (other than NGDC) validate the GOES historic datasets
e. Work though the PPBS process to re-align SWx program R&R for SWPC & NGDC

Public Law 106-554 is commonly referred to as the Data Quality Act

Issue
List of Issues from Prior Reviews

- **NightSat Mission Concept (1QFY08) – active**
- **NGS Aerial Photography (1QFY08) – active**
- **DMSP Data in CLASS (1QFY08) – active**

✓ *Federal Enterprise Ionosonde Network (4QFY07) – NLAI*

✓ *Station-Level Metadata (4QFY07) – NLAI*

✓ *Boulder-StarLight-Moscow (3QFY07) – NLAI*

✓ *Manpower Investments in CLASS TET (3QFY07) – NLAI*

✓ *CIRES New Hires for EOG (2QFY07) – NLAI*

- **Migrate the DMSP OLS Archive to CLASS (2QFY07) – active**

✓ *Relocate National Park Service Nightsky Team (2QFY07) – NLAI*

✓ *Need for 20+ Tb of Spinning Disk (1QFY07) – NLAI*

- **ADIC-API Needed (1QFY07) – active**

✓ *Upcoming Retirement – Helen Coffey (1QFY07) – NLAI*

NLAI = No Longer An Issue

Summary

Solar & Terrestrial Physics Division

- **All 2QFY07 milestones met & performance measures achieved**
- **Awaiting FY08 base allocation to assess STP financial health**
- **New nighttime lights poster ready for distribution**
- **C/NOFS launch planned for 10 April**
- **Space Wx Workshop – 28 Apr – 02 May (Boulder)**
- **Space Wx Enterprise Forum – 21 May (D.C.)**
- **Difference of opinion on archiving historic GOES SWx data**

Metrics (2QFY08/YTD)

Papers published: 4/12

Papers presented: 7/21 Invited: 0/3 Posters: 3/9

QUESTIONS?